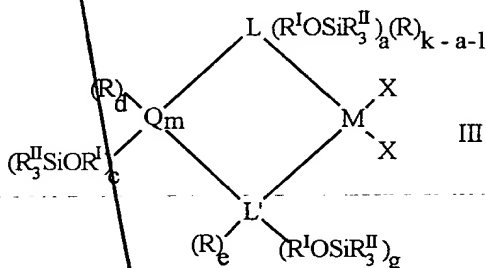
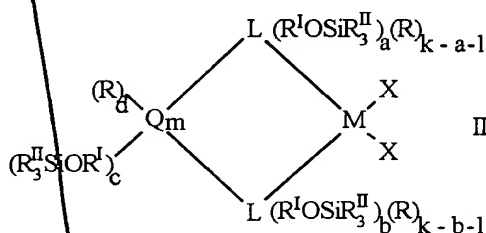


CLAIMS

1. Heterogeneous catalytic system obtainable by reacting a porous inorganic support with an alumoxane and subsequently supporting at least one metallocene compound thereon, characterized in that the metallocene compound is defined by the following general formulas:



wherein:

L, equal to or different from each other, is selected from the group comprising:
 15 cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl or benzoindenyl;

each R is independently selected from hydrogen, C₁-C₂₀ alkyl, C₃-C₂₀ cycloalkyl, C₆-C₂₀ aryl, C₃-C₂₀ alkenyl, C₇-C₂₀ arylalkyl, C₇-C₂₀ alkylaryl, C₈-C₂₀ arylalkenyl, linear or branched, optionally substituted by 1 to 10 halogen atoms, or a group SiR''₃;

each R^I, equal to or different from each other, is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to 5 heteroatoms of groups 14 to 16 of the periodic table of the elements and boron ; preferably it is: C₁-C₂₀ alkylene, C₃-C₂₀ cycloalkylene, C₆-C₂₀ arylene, C₇-C₂₀ alkenyl, C₇-C₂₀ arylalkylene, or alkylarylene, linear or branched, or a group SiR''₂;

each R'' is independently selected from C₁-C₂₀ alkyl, C₃-C₂₀ cycloalkyl, C₆-C₂₀ aryl, C₃-C₂₀ alkenyl, C₇-C₂₀ arylalkyl, C₈-C₂₀ arylalkenyl or C₇-C₂₀ alkylaryl, linear or branched; preferably R'' is methyl, ethyl or isopropyl;

each Q is independently selected from B, C, Si, Ge, Sn;

M is a metal of group 3, 4 or 10 of the Periodic Table, Lanthanide or Actinide;

each X is independently selected from: hydrogen, chlorine, bromine, OR^I , NR^I_2 , C_1-C_{20} alkyl or C_6-C_{20} aryl;

L' is N or O;

5 when L is cyclopentadienyl k is equal to 5, when L is indenyl k is equal to 7, when L is fluorenyl or benzoindenyl k is equal to 9, when L is tetrahydroindenyl k is equal to 11 and when L is octahydrofluorenyl, k is equal to 17;

z is equal to 0, 1 or 2;

x is equal to 1, 2 or 3;

10 y is equal to 1, 2 or 3;

x + y + z is equal to the valence of M;

m is an integer which can assume the values 1, 2, 3 or 4;

a and b are integers whose value ranges from 0 to k-1;

f is an integer whose value ranges from 1 to k;

15 g is an integer whose value ranges from 0 to 1;

c and e are equal to 0 or 1;

a + b + c is at least 1;

a + g + c is at least 1;

d is equal to 0, 1 or 2;

20 when Q is B then c + d = 1;

when Q is C, Si, Ge or Sn, then c + d = 2;

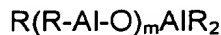
when L' is N, then g + e = 1;

when L' is O, then g = 0 and e = 0.

25 2. Heterogeneous catalytic system according to claim 1 wherein the group $R^I OSiR^I_3$ is selected from $CH_2-CH_2-OSiMe_3$, $CH_2-CH_2-CH_2-OSiMe_3$, $CH_2-O-CH_2-OSiMe_3$, $O-CH_2-CH_2-OSiMe_3$, $SiMe_2-CH_2-CH_2-OSiMe_3$, $SiMe_2-OSiMe_3$ or $SiMe_2-CH_2-CH_2-CH_2-OSiMe_3$.

3. Heterogeneous catalytic system according to claims 1-3 wherein M is titanium, zirconium or hafnium.

30 4. Heterogeneous catalytic system according to claims 1-4 wherein the alumoxane is represented by the formulas:



35 wherein R is alkyl or aryl group containing from 1 to 20 carbon atoms; n ranges from 1 to 40, and m ranges from 3 to 40.

56. Heterogeneous catalyst system according to claims 1-5 wherein the inorganic support is selected from silica, alumina, silica alumina, aluminium phosphates and mixtures thereof.

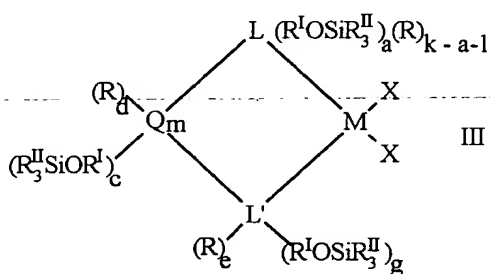
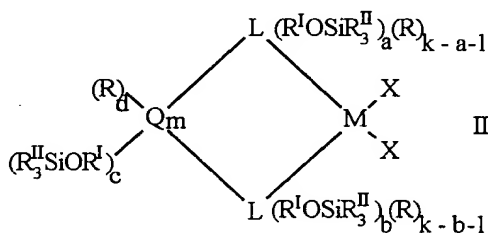
57. Heterogeneous catalyst system according to claims 1-6 wherein the content in transition metal is comprised between 0.01 and 3% by weight.

58. Heterogeneous catalyst system according to claim 1 wherein the content in transition metal is comprised between 0.1 and 1% by weight.

59. Process for the polymerization of alpha olefins in slurry or in gas phase characterized by the use of the heterogeneous catalyst system of claims 1-8.

60. Metallocene compounds according to the following formulas:

10



15

wherein:

L, equal to or different from each other, is selected from the group comprising: cyclopentadienyl, indenyl, tetrahydroindenyl, fluorenyl, octahydrofluorenyl and benzoindenyl;

20 each R is independently selected from hydrogen, C₁-C₂₀ alkyl, C₃-C₂₀ cycloalkyl, C₆-C₂₀ aryl, C₃-C₂₀ alkenyl, C₇-C₂₀ arylalkyl, C₇-C₂₀ alkylaryl, C₈-C₂₀ arylalkenyl, linear or branched, optionally substituted by 1 to 10 halogen atoms, or a group SiR^{II}₃;

each R^I, equal to or different from each other, is a divalent aliphatic or aromatic hydrocarbon group containing from 1 to 20 carbon atoms, optionally containing from 1 to

25 5 heteroatoms of groups 14 to 16 of the periodic table of the elements and boron ; preferably it is: C₁-C₂₀ alkylene, C₃-C₂₀ cycloalkylene, C₆-C₂₀ arylene, C₇-C₂₀ alkenyl, C₇-C₂₀ arylalkylene, or alkylarylene, linear or branched, or a group SiR^{II}₂;

each R'' is independently selected from C_1-C_{20} alkyl, C_3-C_{20} cycloalkyl, C_6-C_{20} aryl, C_3-C_{20} alkenyl, C_7-C_{20} arylalkyl, C_8-C_{20} arylalkenyl or C_7-C_{20} alkylaryl, linear or branched; preferably R'' is methyl, ethyl or isopropyl;

each Q is independently selected from B, C, Si, Ge, Sn;

- 5 M is a metal of group 3, 4 or 10 of the Periodic Table, Lanthanide or Actinide; preferably it is titanium, zirconium or hafnium;

each X is independently selected from: hydrogen, chlorine, bromine, OR'' , NR''_2 , C_1-C_{20} alkyl or C_6-C_{20} aryl;

L' is N or O

- 10 when L is cyclopentadienyl k is equal to 5, when L is indenyl k is equal to 7, when L is fluorenyl or benzoindenyl k is equal to 9, when L is tetrahydroindenyl k is equal to 11 and when L is octahydrofluorenyl, k is equal to 17;

z is equal to 0, 1 or 2;

x is equal to 1, 2 or 3;

- 15 y is equal to 1, 2 or 3;

$x + y + z$ is equal to the valence of M ;

m is an integer which can assume the values 1, 2, 3 or 4;

a and b are integers whose value ranges from 0 to $k-1$;

f is an integer whose value ranges from 1 to k ;

- 20 g is an integer whose value ranges from 0 to 1;

c and e are equal to 0 or 1;

$a + b + c$ is at least 1;

$a + g + c$ is at least 1;

d is equal to 0, 1 or 2;

- 25 when Q is B then $c + d = 1$;

when Q is C, Si, Ge or Sn, then $c + d = 2$;

when L' is N, then $g + e = 1$;

when L' is O, then $g = 0$ and $e = 0$.

characterized in that at least one L is a fluorenyl, benzoindenyl or octahydrofluorenyl ring,

- 30 optionally substituted by C_1-C_{20} alkyl, C_3-C_{20} cycloalkyl, C_6-C_{20} aryl, C_3-C_{20} alkenyl, C_7-C_{20} arylalkyl, C_8-C_{20} arylalkenyl or C_7-C_{20} alkylaryl.

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bz

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a, 1